Annual Report

Washington State Department of Ecology
Project #2003-017-00
Contract #CR-62902
Habitat Characterization for
Integrated Status and Effectiveness Monitoring in
The Wenatchee Subbasin
Glenn Merritt - 1/13/06

Abstract:

During July-September 2005, the Washington State Department of Ecology (WDOE) sampled habitat, including macroinvertebrate assemblages, among 50 "randomly" chosen stream reaches in the Wenatchee River Basin. Field data were recorded onto Rite-in-Rain paper forms that we constructed prior to the field season. Habitat measurements were closely coordinated with fish population assessments by Wenatchee National Forest staff. Data were entered into electronic files and reviewed for errors prior constriction of metrics. All data (raw and calculated) were reviewed prior to delivery.

Introduction:

Project #2003-017-00 (Project) seeks to develop two novel monitoring and evaluation programs:

(i) subbasin-scale pilot status and trend monitoring efforts for anadromous salmonids and their habitat in the Wenatchee, John Day and South Fork Salmon River basins, and

(ii) effectiveness monitoring for suites of habitat restoration projects in selected watersheds within the three target subbasins. This work – critical for implementing the 2000 NMFS FCRPS Biological Opinion (RPA Actions 180, 181, and 183) (BiOp) – builds on current status and trend monitoring programs within each of these basins. Several regional and local organizations are funding and implementing these programs. In short, this project will integrate existing and new monitoring and evaluation activities in three pilot subbasins to help ensure that provisions of the BiOp are satisfied.

The WDOE's work on this project enables the Bonneville Power Administration (BPA) to implement the Project in the Wenatchee Subbasin. Specifically, within this SOW, Washington State Department of Ecology (WDOE) is characterizing channel and riparian physical habitat quality within the Wenatchee River Subbasin. Elements of this work expand upon previous monitoring work being conducted by WDOE and are key components of the two monitoring and evaluation programs developed by the Project. Elements of this work are interrelated with other Project components including fish abundance and distribution surveys. This work provides the context for, and facilitates the interpretation of, data collected in other Project components. For example, habitat quality characterizations provide the context for understanding watershed-scale variation in spawner distribution and smolt production. This work also serves as the reach-scale ground truthing component of GIS classification work.

Project Area

Sampling occurred in randomized stream reaches in the Wenatchee Sub-basin (Water Resource Inventory Area 45) of the Upper Columbia Basin. Reaches were twenty times the bankfull width, with minimum length of 150 m and maximum length of 500 m. Locations and sample dates are listed below.

REACH LOCATIONS

SITE_ID	LatMapWGS84	LonMapWGS84
WC503432-001	47.7668183	-120.727052
WC503432-002	47.966073	-121.101902
WC503432-006	47.608213	-121.026694
WC503432-009	47.651607	-120.669409
WC503432-015	47.918804	-120.709583
WC503432-016	47.929619	-120.881717
WC503432-017	47.79038333	-120.6406
WC503432-018	47.579388	-120.662983
WC503432-026	47.558583	-120.905574
WC503432-027	47.378606	-120.687495
WC503432-029	47.389	-120.605003
WC503432-032	47.767464	-120.777714
WC503432-038	47.9109	-120.739749
WC503432-042	47.627019	-120.644231
WC503432-043	47.701698	-121.054001
WC503432-046	47.425527	-120.703001
WC503432-048	47.765028	-120.655266
WC503432-049	47.385058	-120.49298
WC503432-152	47.360612	-120.568084
WC503432-155	47.52607	-120.622995
WC503432-166	47.776517	-121.011216
WENMASTER-0008	47.746395	-120.956595
WENMASTER-0010	47.860573	-120.644508
WENMASTER-0011	48.066675	-120.845313
WENMASTER-0012	47.700502	-121.053732
WENMASTER-0013	47.421364	-120.588944
WENMASTER-0020	47.57035	-120.934387
WENMASTER-0029	47.477922	120.618943
WENMASTER-0045	47.404089	-120.657673
WENMASTER-0050	47.567556	-120.786784
WENMASTER-0052	47.73398333	-120.86628333
WENMASTER-0054	47.793366	-120.636566
WENMASTER-0055	47.990314	-120.811671
WENMASTER-0060	47.79348333	-121.06038333
WENMASTER-0067	47.876709	-120.686845
WENMASTER-0071	47.966717	-120.793067
WENMASTER-0093	47.445395	-120.648756
WENMASTER-0097	47.355159	-120.616877
WENMASTER-0099	47.998388	-120.767863
WENMASTER-0100	47.61825	-120.94981667
WENMASTER-0106	47.692238	-120.7399
WENMASTER-0109	47.373425	-120.672785
WENMASTER-0119	48.020924	-120.829485
WENMASTER-0131	47.901039	-120.702673
WENMASTER-0148	47.557715	-120.941815
WENMASTER-0164	47.63244	-120.984546
WENMASTER-0179	47.91632	-120.7466
WENMASTER-0195	47.904984	-120.726899

WENMASTER-0231	47.98525	-120.77511667
WENMASTER-0269	47.37685	-120.589106

SAMPLE DATES:

SITE_ID	START_DATE	END_DATE
WC503432-001	8/16/2005	8/16/2005
WC503432-002	8/10/2005	8/10/2005
WC503432-006	8/23/2005	8/23/2005
WC503432-009	7/14/2005	7/14/2005
WC503432-015	7/11/2005	7/11/2005
WC503432-016	9/14/2005	9/14/2005
WC503432-017	8/3/2005	8/3/2005
WC503432-018	8/17/2005	8/17/2005
WC503432-026	8/10/2005	8/10/2005
WC503432-027	7/7/2005	7/7/2005
WC503432-029	6/30/2005	7/1/2005
WC503432-032	8/11/2005	8/11/2005
WC503432-038	8/9/2005	8/9/2005
WC503432-042	7/28/2005	7/28/2005
WC503432-043	8/30/2005	8/30/2005
WC503432-046	7/13/2005	7/13/2005
WC503432-048	9/21/2005	9/21/2005
WC503432-049	7/13/2005	7/13/2005
WC503432-152	7/5/2005	7/5/2005
WC503432-155	7/12/2005	7/12/2005
WC503432-166	8/22/2005	8/22/2005
WENMASTER-0008	7/27/2005	7/27/2005
WENMASTER-0010	7/12/2005	7/12/2005
WENMASTER-0011	8/15/2005	8/15/2005
WENMASTER-0012	7/26/2005	7/26/2005
WENMASTER-0013	7/21/2005	7/21/2005
WENMASTER-0020	9/12/2005	9/12/2005
WENMASTER-0029	7/21/2005	7/21/2005
WENMASTER-0045	7/18/2005	7/18/2005
WENMASTER-0050	8/25/2005	10/11/2005
WENMASTER-0052	8/29/2005	8/29/2005
WENMASTER-0054	8/3/2005	8/4/2005
WENMASTER-0055	9/7/2005	9/7/2005
WENMASTER-0060	8/22/2005	8/22/2005
WENMASTER-0067	7/19/2005	7/19/2005
WENMASTER-0071	7/8/2005	7/8/2005
WENMASTER-0093	7/6/2005	7/6/2005
WENMASTER-0097	7/5/2005	7/5/2005
WENMASTER-0099	8/31/2005	8/31/2005
WENMASTER-0100	8/8/2005	8/8/2005
WENMASTER-0106	7/7/2005	7/7/2005
WENMASTER-0109	7/8/2005	7/8/2005
WENMASTER-0119	9/8/2005	9/8/2005
WENMASTER-0131	7/12/2005	7/12/2005
WENMASTER-0148	9/6/2005	9/6/2005
WENMASTER-0164	7/20/2005	7/20/2005
WENMASTER-0179	9/20/2005	9/20/2005
WENMASTER-0195	8/8/2005	8/8/2005
WENMASTER-0231	9/13/2005	9/13/2005
WENMASTER-0269	9/21/2005	9/21/2005

Methods and Materials

Channel and riparian habitat quality were characterized by collecting data for each specific indicator listed in Table 1, per protocols described in Hillman (2004; http://tinyurl.com/6bmwb) at each of 50 sampling sites. WDOE trained all field personnel in necessary methodological and safety protocols.

In advance of the field season, WDOE met with USFS to plan season sampling schedule and establish coordination protocols. All sites sampled met access and safety criteria determined through reconnaissance conducted by USFS and CCCD. Some reconnaissance occurred after the start of the sampling season.

A component of the habitat quality characterization included collecting macroinvertebrate samples per protocols in Hillman (2004). These samples were collected, stored, and delivered to a NOAA-Fisheries contract representative (Terraqua, Inc.) on October 11, 2005.

WDOE delivered one set of photocopied raw data sheets and quality controlled, geo-referenced raw data, with summarized site-averaged values for each indicator listed in Table 1, in Microsoft-Access format to NOAA-Fisheries. WDOE also provided digital photographs of sampling sites to document physical habitat conditions at the time of sampling and to facilitate data sheet quality assurance review.

Results Summary:

We delivered macroinvertebrate samples to a NOAA-Fisheries contracted representative (Terraqua, Inc.) on October 11, 2005. We delivered raw, quality-assured habitat data, photographs and photocopies of field forms to NOAA-Fisheries along with metric data (for Table 1 indicators) on November 18, 2005.

Table 1. The specific biological and physical metrics that were monitored.

General characteristics	Specific indicators	Data Delivered for Each of 50 Sites
Site Description		Site number (from Sample Site List); stream name; short site location description (e.g. Trout Creek upstream of Pine Campground); actual coordinates; field crew member names; date(s) sampled; time began sampling; general narrative comments about the site including any unusual habitat features or notes regarding site location or access.
Habitat Quality	Dominant substrate	Raw pebble count data at 105 measurement points; site-calculated dominant substrate size.
	Embeddedness	Raw embeddedness data at 55 measurement points; site-averaged embeddedness percent.
	LWD	Site-total count of LWD pieces within each of three size categories (pieces/km).
	Pools	Site-total count pools (pools/km).
	Residual pool depth	Raw residual depth of each pool; site-average residual depth of all site pools.
	Fish cover	Percent class by area of stream covered by each of 9 cover types at 11 measurement points; site-averaged percent class for each of 9 cover types.
	Off-channels habitats	List of each off-channel habitat unit by type; length of each off-channel habitat unit; site-total count of each of 6 types of off-channel habitats; site-total length of off-channel habitats.
	Macro-invertebrate composition	Macroinvertebrate sample. (Several streams were dry and therefore could not be sampled for invertebrates).
Channel condition	Stream gradient	Straight-line distance between transect/thalweg intersections; straight line length of sample-site; elevation drop between transect/thalweg intersections; total elevation drop over sample site; site averaged stream gradient.
	Width/depth ratio	Site averaged width/depth ratio.
	Wetted width	Site averaged wetted width.
	Bankfull width	Site averaged bankfull width.
	Bank stability	Percent of the lineal distance of bank that is actively eroding at the active channel height at 22 measurement points; site-averaged percent of the lineal distance of bank that is actively eroding at the active channel height.
	Entrenchment Ratio	Entrenchment ratio calculated at each measuring point; site-averaged entrenchment ratio.
	Sinuosity	Site-averaged sinuosity.
Riparian Condition	Structure	Percent class of areal cover (by three vegetation classes) at each of 22 measurement points; site-averaged percent class of areal cover (by three vegetation classes); vegetation type will be described at each of 22 measurement points.
	Disturbance	The presence (11 classes) and proximity (4 classes) of human land-use activities in the riparian area at 22 measurement points.
	Canopy cover	Raw canopy cover data at 66 measurement points; site-averaged canopy cover
Reach Characterization	Channel type (Rosgen)	Predominant Rosgen Level 1 channel type within site based on sinuosity, entrenchment ratio, width: depth ratio, and slope; notes if site encompasses more than one Rosgen channel type.
	Bed-form type	Predominant bed-form type within site; amount of confinement within site.